

1
SEQUENCE LISTING

<110> Kaplan, Aaron
Lieman-Hurwitz, Judy
Rachmievitch, Shimon
Schatz, Daniella
Mittler, Ron

<120> PLANTS CHARACTERIZED BY ENHANCED GROWTH AND METHODS AND NUCLEIC ACID CONSTRUCTS USEFUL FOR GENERATING SAME

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<170> PatentIn version 3.2

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Ser Leu Thr Asp Ile Asp Leu Arg Gln Ala Thr Pro Ile His Trp Leu
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Val Leu Leu Tyr Trp Gly Val Asp Ala Leu Ala Thr Gly Leu Ser Pro
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Val Arg Ala Ala Ala Leu Val Gly Leu Ala Lys Leu Thr Leu Tyr Leu
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Tyr Gly Leu Asn Gln Trp Ile Tyr Gly Val Glu Glu Leu Ala Thr Trp
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Val Asp Arg Asn Ser Val Ala Asp Phe Thr Ser Arg Val Tyr Ser Tyr
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Phe Ser Ala Ala Ala Ile Gly Val Trp Arg Gly Trp Leu Pro Lys Leu
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Val Thr Ala Val Thr Ala Val Arg Gln Val Ser Arg Leu Arg Arg Asp
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Arg Asn Pro Gln Ala Phe Trp Leu Met Ala Ser Leu Ala Gly Leu Ala
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Gly Met Leu Gly His Gly Leu Phe Asp Thr Val Leu Tyr Arg Pro Glu
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Thr Ser Thr Thr Met Leu Gly Ile Phe Met Leu Leu Cys Gly Ala Phe			
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Cys Arg Gln Thr Leu Ala Pro Glu Gly Ile Trp Ile Met Gly Ala Leu
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Pro Pro Leu Ala Thr Trp Val Asp Pro Glu Ser Thr Leu Ser Lys Thr
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Ala Ala Val Leu Leu Ser Ser Ile Tyr Ala Leu Ala Pro Phe Ala Ser
 50 55 60

Ser Thr Leu Val Gly Leu Leu Val Ala Cys Val Gly Phe Trp Leu
 65 70 75 80

Leu Leu Thr Leu Ser Asp Glu Val Thr Pro Ala Asn Val Ser Ser Val
 85 90 95

Thr Pro Ile His Leu Leu Val Leu Leu Tyr Trp Gly Ile Ala Val Ile
 100 105 110

Ala Thr Ala Leu Ser Pro Val Lys Lys Ala Ala Leu Asn Asp Leu Gly
 115 120 125

Thr Leu Thr Leu Tyr Leu Leu Phe Ala Leu Cys Ala Arg Val Leu
 130 135 140

Arg Ser Pro Arg Leu Arg Ser Trp Ile Leu Thr Leu Tyr Leu His Val
 145 150 155 160

Ser Leu Ile Val Ser Val Tyr Gly Leu Arg Gln Trp Phe Phe Gly Ala
 165 170 175

Thr Ala Leu Ala Thr Trp Val Asp Pro Glu Ser Pro Leu Ser Lys Thr
 180 185 190

Thr Arg Val Tyr Ser Tyr Leu Gly Asn Pro Asn Leu Leu Ala Gly Tyr
 195 200 205

Leu Leu Pro Ala Val Ile Phe Ser Leu Val Ala Ile Phe Ala Trp Gln
 210 215 220

Ser Trp Leu Lys Lys Ala Leu Ala Leu Thr Met Leu Ile Val Asn Thr
 225 230 235 240

Ala Cys Leu Ile Leu Thr Phe Ser Arg Gly Gly Trp Ile Gly Leu Val
 245 250 255

Val Ala Val Leu Ala Val Met Ala Leu Leu Val Phe Trp Lys Ser Val
 260 265 270

Glu Met Pro Pro Phe Trp Arg Thr Trp Ser Leu Pro Ile Val Leu Gly
 275 280 285

Gly Leu Ile Gly Ile Leu Leu Leu Ala Val Ile Phe Val Glu Pro Val
 290 295 300

Arg Leu Arg Val Phe Ser Ile Phe Ala Asp Arg Gln Asp Ser Ser Asn
 305 310 315 320

Asn Phe Arg Arg Asn Val Trp Asp Ala Val Phe Glu Met Ile Arg Asp
 325 330 335

Arg Pro Ile Phe Gly Ile Gly Pro Gly His Asn Ser Phe Asn Lys Val
 340 345 350

Tyr Pro Leu Tyr Gln His Pro Arg Tyr Thr Ala Leu Ser Ala Tyr Ser
 355 360 365

Ile Leu Phe Glu Val Thr Val Glu Thr Gly Phe Val Gly Leu Ala Cys
 370 375 380

Phe Leu Trp Leu Ile Ile Val Thr Phe Asn Thr Ala Leu Leu Gln Val
 385 390 395 400

Arg Arg Leu Arg Arg Leu Arg Ser Val Glu Gly Phe Trp Leu Ile Gly
 405 410 415

Ala Ile Ala Ile Leu Leu Gly Met Leu Ala His Gly Thr Val Asp Thr
 420 425 430

Val Trp Tyr Arg Pro Glu Val Asn Thr Leu Trp Trp Leu Ile Val Ala
 435 440 445

Leu Ile Ala Ser Tyr Trp Thr Pro Leu Thr Gln Asn Gln Thr Asn Pro
 450 455 460

Ser Asn Pro Glu Pro Ala Val Asn
 465 470

<210> 8
 <211> 1425
 <212> DNA
 <213> Anabaena PCC7120

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ttacttcagt ggggagacat gattgcagct gcgttactca gcttgatata tgttttggct	180
ccctttgtct ctagtactct cgttggtgtg ctgctgatag cttgtgttagg tttttggtta	240
ttgttgactt tatctgtatga accttcatca aacaataact cccttgatca tcccatacac	300
ctgttggtgt tgctctattt gggaaattgct gctgttagcaa cggcattatac accagtcaag	360
aaggcagcat taactgattt gttaaccttg actttgtatt tgctactatt tgcttttgt	420
gccaggggtgc tgagatcgcc gcgtctgagg tcttggatca ttaccctcta cctatctgca	480
tcactgggtt tcagttatata tggaaatgcga caatggcggtt ttgggtgcgc cccactggcg	540
acttgggttg atccagagtc caccttgcataaaaaccacaa gggtttacag ttattttaggc	600
aatcccaatt tggatggctgg ttattttagta ccggcggtga ttggatgcctt catggcagtt	660
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gcttgcctaa ttttactta tagtcgtggc ggctggattt gtctgtgtt agcagtctta	780
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gtcgagccag tccggtttcg agttctcagt attttgccg atcgc当地 a tagcagcaat	960
aatttcgcc gcaacgtgtt ggtatgtt tttgagatga tccgc当地 cccattttt	1020
ggtattggcc ctggtcataa ttcttttaat aaagtctacc ctctttacca aagacctcg	1080
tatagtgc当地 taagtgc当地 ttccatcttc cttaggggtt ctgttagaaat gggtttgtt	1140
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cggccactgc gccaatctgc caatgtcaaa ggatgggtt tggtgggtgc cttagccaca	1260
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actcttttgtt ggttaatggt tgctctcatt gcttagtattt ggacacctttt atccgcaaac	1380
caatgtcaag aactcaattt attaaggaa gaacccacaa gcaac	1425

<210> 9
 <211> 1419
 <212> DNA
 <213> Nostoc punctiforme

<400> 9

12

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accagttacg tacaccgttc tctgggtggga ctgttaagct cttggcggca aaccagcgtc	120
ttgattcagt ggggagatgc gatagcagct gtattactca gctcaataata tgcccttgca	180
ccttttgctt cgagtacttt ggttaggttta ttgctggtcg cttgtgtggg attttggcta	240
tttgttactt tatctgatga agtcacacca gcaaattgtct cgtcagtcac tcccattcat	300
ctactggtat tgctctactg gggaaattgcc gtaatcgcaa cagcattatc accagtgaaa	360
aaagcggcac ttaacgactt gggaaacttg accttgtatt tgctactatt tgcccttgc	420
gccagggtat taaggtcgcc tcgcctccgg tcttggatc tcaccctta tctgcacgta	480
tcgttaattt tcagtgctca tggattgcgg caatggttt ttggagccac agcactggca	540
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aatcccaact tattggctgg ataccttta ccagcagtaa ttttagctt ggtagcaatt	660
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gcgggtatgg cattgctagt ttttggaaag agtgtggaaa tgcctccctt ttggcgtact	840
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gttagagccag ttgcctgcg ggtgttcagc atttttgcgt accgtcaaga tagtagtaat	960
aattttcgtc gaaatgtgtg ggatgctgac tttgagatga ttcgcgatcg cccaaatttc	1020
ggtattggcc ctggtcacaa ctcttttaat aaagtttatac cgctctacca acaccctcgg	1080
tacactgttt taagtgccta ttgcattttt tttgaagtga ctgtagaaac tgggtttgtt	1140
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cgacgattgc gacgatttgag aagtgttagag ggattttgggt taattggagc gatcgctatt	1260
ttgttgggtt tgctcgctca cggcactgta gatactgtct ggtatcgcc tgaagtcaat	1320
accctctgggtt ggctcatcgat tgctttaattt gccagctact ggacacctt aactcaaaac	1380
cagacaatac catctaaccgc agaaccagca gtaaactaa	1419

<210> 10
<211> 461
<212> PRT
<213> Trichodesmium erythraeum

<400> 10

Met Asn Ser Val Trp Lys Lys Leu Thr Leu Thr Asn Leu Ser Phe Ser
1 5 10 15

Asp Ser Glu Trp Leu Asn Ala Ser Tyr Leu Tyr Gly Leu Leu Asn Gly
20 25 30

Ser Leu Tyr Asn Trp Arg Arg Gly Ser Trp Leu Met Gln Trp Gly Glu
35 40 45

Pro Leu Gly Phe Val Leu Leu Ala Ile Val Phe Thr Leu Ala Pro Phe
50 55 60

Val	Asn	Thr	Thr	Leu	Ile	Gly	Phe	Leu	Leu	Leu	Ala	Ser	Ala	Gly	Phe
65					70					75					80

Trp Val Leu Leu Lys Val Ser Asp Asn Thr Gln Glu Tyr Leu Thr Pro
85 90 95

Ile His Leu Leu Ile Phe Leu Tyr Trp Ser Ile Ala Thr Leu Ala Val
 100 105 110

Val Ile Ser Pro Ala Lys Thr Ala Ala Phe Ser Gly Trp Val Lys Leu
 115 120 125

Thr Leu Tyr Leu Leu Phe Ala Ser Gly Ser Leu Val Leu Arg Ser
 130 135 140

Pro Arg Leu Arg Ser Trp Leu Ile Asn Ile Tyr Leu Leu Val Ser Leu
 145 150 155 160

Val Val Ser Phe Tyr Gly Ile Arg Gln Trp Ile Asp Lys Val Glu Pro
 165 170 175

Leu Ala Thr Trp Asn Asp Pro Thr Ser Ala Gln Ala Gly Ala Thr Arg
 180 185 190

Val Tyr Ser Tyr Leu Gly Asn Pro Asn Leu Leu Gly Gly Tyr Leu Leu
 195 200 205

Pro Ala Ile Ala Leu Ser Phe Val Ala Ile Phe Ala Trp Ser Ser Trp
 210 215 220

Ala Arg Lys Ser Leu Ala Val Thr Ile Leu Leu Val Ser Cys Ala Cys
 225 230 235 240

Leu Arg Tyr Thr Gly Ser Arg Gly Ser Trp Ile Gly Phe Leu Ala Leu
 245 250 255

Met Phe Ala Met Leu Ile Leu Met Trp Tyr Trp Trp Arg Ser Tyr Met
 260 265 270

Pro Ser Phe Trp Gln Ile Trp Ser Leu Pro Ile Ala Val Gly Ser Phe
 275 280 285

Ala Gly Leu Leu Ile Leu Ala Val Val Leu Leu Glu Pro Leu Arg Asp
 290 295 300

Arg Val Leu Ser Val Phe Ala Gly Arg Gln Asp Ser Ser Asn Asn Phe
 305 310 315 320

Arg Met Asn Val Trp Met Ser Val Phe Asp Met Ile Arg Asp Arg Pro
 325 330 335

Ile Leu Gly Ile Gly Pro Gly Asn Asp Val Phe Asn Lys Ile Tyr Pro
 340 345 350

Leu Tyr Gln Arg Pro Arg Tyr Ser Ala Leu Ser Ser Tyr Ser Val Pro
 355 360 365

Leu Glu Ile Val Val Glu Thr Gly Phe Ile Gly Leu Thr Ala Phe Leu
 370 375 380

Trp Leu Leu Leu Val Thr Phe Asn Gln Gly Val Leu Gln Leu Lys Arg
 385 390 395 400

Leu Arg Asp Ala Asp Asn Pro Gln Gly Tyr Trp Leu Ile Gly Ala Ile
 405 410 415

Ala Ala Met Val Gly Leu Ile Gly His Gly Leu Val Asp Thr Val Trp
 420 425 430

Tyr Arg Pro Gln Val Asn Thr Ile Trp Trp Leu Met Val Ala Ile Ile
 435 440 445

Ala Ser Tyr Ser Ser Gln Gln Gly Val Arg Ser Arg Glu
 450 455 460

<210> 11
 <211> 463
 <212> PRT
 <213> Thermosynechococcus elongatus BP-1

<400> 11

Met Asp Val Leu Leu Arg Arg Leu Asp Val Glu Gly Trp Arg Ser His
 1 5 10 15

Ser Gly Val Gly Arg Leu Leu Gly Leu Leu Gln Gly Trp Gln Glu Lys
 20 25 30

Ser Trp Leu Gly Arg Trp Leu Pro Ser Leu Ala Val Leu Leu Val Gly
 35 40 45

Leu Val Leu Val Leu Ala Pro Leu Met Pro Ser Gly Met Ile Gly Met
 50 55 60

Leu Leu Ala Ala Gly Ser Gly Phe Trp Leu Leu Trp Thr Leu Ala Gly
 65 70 75 80

Glu Arg Glu Gly Arg Trp Ser Gly Val His Leu Leu Val Leu Leu Tyr
 85 90 95

Trp Gly Ile Ala Leu Leu Ala Thr Val Leu Ser Pro Val Pro Arg Ala
 100 105 110

Ala Met Val Gly Leu Gly Lys Leu Thr Leu Tyr Leu Leu Phe Phe Ala
 115 120 125

Leu Ala Glu Arg Val Met Arg Asn Glu Arg Trp Arg Ser Arg Leu Leu
 130 135 140

Thr Val Tyr Leu Leu Thr Ala Leu Met Val Ser Val Glu Gly Val Arg
 145 150 155 160

Gln Trp Ile Phe Gly Ala Glu Pro Leu Ala Thr Trp Thr Asp Pro Glu
 165 170 175

Ser Ala Leu Ala Asn Val Thr Arg Val Tyr Ser Phe Leu Gly Asn Pro
 180 185 190

Asn Leu Leu Ala Gly Tyr' Leu Leu Pro Ser Val Pro Leu Ser Ala Ala
 195 200 205

Ala Ile Ala Val Trp Gln Gly Trp Leu Pro Lys Leu Leu Ala Val Val
 210 215 220

Met Leu Gly Met Asn Ala Ala Ser Leu Ile Leu Thr Phe Ser Arg Gly
 225 230 235 240

Gly Trp Leu Gly Leu Val Ala Ala Thr Ile Ala Gly Val Val Leu Leu
 245 250 255

Gly Ile Trp Phe Trp Pro Arg Leu Pro Leu Gln Trp Arg Arg Trp Gly
 260 265 270

Val Pro Thr Met Gly Gly Leu Ala Ile Ala Leu Cys Met Gly Thr Ile
 275 280 285

Val Ser Val Pro Pro Leu Arg Glu Arg Ala Ala Ser Ile Phe Val Ala
 290 295 300

Arg Gly Asp Ser Ser Asn Asn Phe Arg Ile Asn Val Trp Met Ala Val
 305 310 315 320

Gln Gln Met Ile Trp Ala Arg Pro Trp Leu Gly Ile Gly Pro Gly Asn
 325 330 335

Val Ala Phe Asn Gln Ile Tyr Pro Leu Tyr Gln Val Asn Val Arg Phe
 340 345 350

Thr Ala Leu Gly Ala Tyr Ser Ile Phe Leu Glu Ile Leu Val Glu Val
 355 360 365

Gly Phe Ile Gly Phe Gly Val Phe Leu Trp Leu Leu Ala Val Leu Gly
 370 375 380

Asp Arg Ala Arg Arg Cys Phe Glu Glu Leu Arg Ala Thr Gly Ser Pro
 385 390 395 400

Gln Gly Phe Trp Leu Met Gly Thr Ile Ala Ala Met Ile Gly Met Leu
 405 410 415

Thr His Gly Leu Val Asp Thr Ile Trp Phe Arg Pro Glu Val Ala Thr
 420 425 430

Leu Trp Trp Leu Met Val Ala Ile Val Ala Ser Phe Thr Pro Phe Gln
 435 440 445

Ser Lys Thr Ala Asn Gly Thr Phe Ser Asn Arg Asp Pro Glu Pro
 450 455 460

<210> 12
 <211> 439
 <212> PRT
 <213> Prochlorococcus marinus

<400> 12

Met Pro Lys Thr Ala Ala Pro Gln Pro Leu Leu Leu Arg Trp Gln Gly
 1 5 10 15

His Ile Pro Ser Ser Glu Ala Met Gln Met Arg Leu Gln Trp Ile Ala
 20 25 30

Gly Leu Leu Leu Met Met Leu Leu Ala Thr Leu Pro Met Leu Thr Arg
 35 40 45

Thr Gly Leu Gly Leu Thr Ile Leu Ala Ala Gly Ala Leu Trp Ile Ile
 50 55 60

Trp Gly Cys Val Thr Pro Ala Gly Arg Ile Gly Ser Ile Ser Ser Cys
 65 70 75 80

Leu Leu Val Phe Phe Ala Ile Ala Cys Leu Ala Thr Gly Phe Ser Pro
 85 90 95

Val Pro Leu Ala Ala Ala Lys Gly Leu Ile Lys Leu Ile Ser Tyr Leu
 100 105 110

Gly Val Tyr Ala Leu Met Arg Gln Leu Leu Ala Thr Ser Ser Asp Trp
 115 120 125

Trp Asp Arg Leu Val Ala Ala Leu Leu Thr Gly Glu Leu Ile Ser Ser
 130 135 140

Val Ile Ala Ile Arg Gln Leu Tyr Ala Pro Ala Glu Glu Met Ala His
 145 150 155 160

Trp Ala Asp Pro Asn Ser Val Ala Ala Gly Thr Val Arg Ile Tyr Gly
 165 170 175

Pro Leu Gly Asn Pro Asn Leu Leu Ala Gly Tyr Leu Met Pro Ile Leu
 180 185 190

Pro Leu Ala Leu Val Ala Leu Leu Arg Trp Gln Gly Leu Gly Ala Lys
 195 200 205

Leu Tyr Ala Met Val Ala Leu Gly Leu Gly Ile Thr Ala Thr Leu Phe
 210 215 220

Ser Phe Ser Arg Gly Gly Trp Leu Gly Met Leu Ser Ala Leu Ala Val
 225 230 235 240

Ile Leu Val Leu Leu Leu Arg Ser Thr Ser His Trp Pro Leu Val
 245 250 255

Trp Arg Arg Leu Leu Pro Leu Ile Val Ile Val Leu Gly Thr Ala Met
 260 265 270

Leu Val Ile Ala Ala Thr Gln Ile Glu Pro Ile Arg Thr Arg Ile Thr
 275 280 285

Ser Leu Ile Ala Gly Arg Ser Asp Ser Ser Asn Asn Phe Arg Ile Asn
 290 295 300

Val Trp Leu Ser Ser Leu Glu Met Ile Gln Ala Arg Pro Trp Leu Gly
 305 310 315 320

Ile Gly Pro Gly Asn Ala Ala Phe Asn Arg Ile Tyr Pro Leu Phe Gln
 325 330 335

Gln Pro Lys Phe Asn Ala Leu Ser Ala Tyr Ser Val Pro Leu Glu Ile
 340 345 350

Leu Val Glu Thr Gly Leu Ala Gly Leu Met Ala Ser Leu Ala Leu Val
 355 360 365

Ile Thr Gly Met Arg Lys Gly Leu Ala Gly Leu Asn Ser Asn His Pro

370 375 380

Leu Ala Leu Pro Ala Leu Ala Ser Leu Ala Ala Ile Ala Gly Leu Ala
385 390 395 400

Val His Gly Ile Thr Asp Thr Ile Phe Phe Arg Pro Glu Val Gln Leu
405 410 415

Val Gly Trp Phe Cys Leu Ala Thr Leu Ala Gln Thr Gln Pro Glu Gln
 420 425 430

Lys Gln Leu Gln Gln Thr Glu
435

<210> 13
<211> 431
<212> PRT
<213> Synechococcus WH 8102

<400> 13

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Met Ala Asp Ala Thr Asp Gln Arg Ser Ile Pro Leu Leu Leu Arg Trp
1           5                   10          15

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Gln Gly Cys Leu Thr Pro Thr Ala Ser Val Gln Gln Arg Leu Glu Leu
20 25 30

Leu Ser Gly Val Val Leu Met Leu Leu Leu Gly Ser Leu Pro Phe Val
35 40 45

Ser Arg Ser Gly Leu Gly Leu Glu Leu Ala Ala Ala Gly Leu Leu Trp
50 55 60

Leu Leu Trp Ser Leu Ile Thr Pro Ala Lys Arg Leu Gly Ala Ile Ser
65 70 75 80

Arg Trp Val Leu Leu Tyr Leu Ala Ile Ala Trp Val Cys Thr Gly Phe
85 90 95

Ser	Pro	Val	Pro	Ile	Ala	Ala	Ala	Lys	Gly	Leu	Leu	Lys	Leu	Thr	Ser
			100					105					110		

Tyr Leu Gly Val Tyr Ala Leu Met Arg Thr Leu Leu Glu Arg Gln Ile
115 120 125

Val Trp Trp Asp Arg Leu Leu Ala Ala Leu Leu Gly Gly Gly Leu Phe
130 135 140

Ser Ser Val Leu Ala Leu Arg Gln Leu Tyr Ala Ser Thr Asp Glu Leu
145 150 155 160

Ala Gly Trp Ala Asp Pro Asn Ser Val Ser Ala Gly Thr Ile Arg Ile
165 170 175

Tyr Gly Pro Leu Gly Asn Pro Asn Leu Leu Ala Gly Tyr Leu Leu Pro
180 185 190

Leu Val Pro Leu Ala Cys Ile Ala Val Leu Arg Trp Lys Arg Leu Ser
195 200 205

Cys Arg Leu Leu Ala Ala Val Thr Ala Leu Leu Ala Gly Ser Ala Thr

210 215 220
Val Phe Thr Tyr Ser Arg Gly Gly Trp Leu Gly Leu Leu Ala Ala Leu
225 230 235 240

Ala Leu Ala Gly Met Leu Ile Leu Leu Arg Thr Thr Ala His Trp Pro
245 250 255

Pro Leu Trp Arg Arg Leu Leu Pro Leu Ala Ala Leu Leu Ile Ala Gly
260 265 270

Ile Ala Leu Ala Leu Ala Ile Thr Gln Leu Asp Pro Ile Arg Thr Arg
275 280 285

Val Leu Ser Leu Val Ala Gly Arg Gly Asp Ser Ser Asn Asn Phe Arg
290 295 300

Ile Asn Val Trp Leu Ala Ala Ile Glu Met Val Gln Asp Arg Pro Trp
305 310 315 320

Leu Gly Ile Gly Pro Gly Asn Ala Ala Phe Asn Ser Ile Tyr Pro Leu
325 330 335

Tyr Gln Gln Pro Lys Phe Asp Ala Leu Ser Ala Tyr Ser Val Pro Leu
340 345 350

Glu Ile Leu Val Glu Thr Gly Ile Pro Gly Leu Leu Ala Cys Leu Gly
355 360 365

Leu Leu Leu Ser Ser Ile Gln Arg Gly Leu Arg Ile His Gly Gln Gln
370 375 380

Gly Leu Ile Ala Ile Gly Ser Leu Ala Ala Ile Ala Gly Leu Leu Thr
385 390 395 400

Gln Gly Ile Thr Asp Thr Ile Phe Phe Arg Pro Glu Val Gln Leu Ile
405 410 415

Gly Trp Phe Ala Leu Ala Ser Leu Gly Ala Thr Trp Leu Arg Asp
420 425 430